



Viola curtisiae, a new rank for a poorly understood species, with notes on *V. hederacea* subsp. *seppeltiana*

Kevin R. Thiele^{1,6}, Miguel de Salas², Neville G. Walsh³, Andre Messina³, R. John Little⁴ and Suzanne M. Prober^{1,5}

¹ School of Biological Sciences, The University of Western Australia, Crawley, WA 6009

² Tasmanian Herbarium, Tasmanian Museum and Art Gallery, Sandy Bay, Tasmania 7005

³ Royal Botanic Gardens Victoria, Birdwood Avenue, Melbourne, Victoria 3004

⁴ 16 Pebble River Circle, Sacramento, California 95831, USA

⁵ CSIRO Land & Water, Private Bag 5, Wembley, WA 6913

⁶ Corresponding author, email: kevin.thiele@uwa.edu.au

Introduction

Adams (1982), in a revision of *Viola* L. for the *Flora of Australia* based largely on a study of herbarium specimens, described seven subspecies under a broadly circumscribed *V. hederacea* Labill., five of which were new while the sixth, *V. hederacea* subsp. *sieberiana* (Spreng.) L.G. Adams was recombined at subspecies rank from *V. sieberiana* Spreng. Adams used subspecies rank for these taxa as he regarded *V. hederacea* as a polymorphic complex, with evidence of intergradation ("clinal variation") between some of his named taxa. Adams thus considered that the Australian-endemic *Viola* sect. *Erpetion* (D.C. ex Sweet) Benth. c Hook. f. comprised only two species, *V. hederacea* and *V. improcera* L.G. Adams.

Field studies by a number of authors have shown, however, that most of Adams' subspecies are morphologically discrete and do not intergrade even when growing in close sympatry or when intermixed. Hence, three species-ranked taxa have been raised from Adams' subspecies, viz. *V. cleistogamoides* (L.G. Adams) Seppelt, *V. fuscoviolacea* (L.G. Adams) T.A. James and *V. perreniformis* (L.G. Adams) R.J. Little & Leiper. *Viola sieberiana* was regarded as distinct by Thiele & Prober (2003), and is currently

Abstract

Viola hederacea subsp. *curtisioe* has till now been a poorly understood taxon, represented by very few specimens from near Mount Field, Tasmania. Field and glasshouse observations of a *Viola* found on the Mount Baw Baw plateau, Victoria, showed that it matches the protologue of *V. hederacea* subsp. *curtisioe*. Field observations at the type locality in Tasmania confirm this. *Viola hederacea* subsp. *curtisioe* and *V. hederacea* subsp. *hederacea* co-occur with no intermediates, indicating that species rank is preferable for the former; it is here recombined as *V. curtisioe* (L.G. Adams) K.R. Thiele, and shown to have a broader distribution, including in Tasmania, than previously recognised. *Viola hederacea* subsp. *seppeltiana* is discussed, and determined to be more closely related to *V. sieberiana* than it is to *V. hederacea*. Accordingly, there are now no recognised subspecies in *V. hederacea*.

Key words: Violaceae; taxonomy; rare species

accepted at species rank by the Australian Plant Census (Council of Heads of Australasian Herbaria 2006–). Three new species, *V. banksii* K.R. Thiele & Prober, *V. eminens* K.R. Thiele & Prober, and *V. silicestris* K.R. Thiele & Prober, have been described since the Adams treatment, resulting in ten currently accepted taxa in sect. *Erpetion*.

Two subspecies (in addition to the autonymic subsp. *hederacea*) remain in Adams' concept of *V. hederacea*, viz. subsp. *seppeltiana* and subsp. *curtisiae*. Thiele & Prober (2003) considered that *V. hederacea* subsp. *seppeltiana*, which occurs in South Australia and western Victoria, cannot be distinguished morphologically from *V. sieberiana*, which occurs on the Hawkesbury Sandstones near Sydney, and treated it under that species. The State Herbarium of South Australia accepts *V. hederacea* subsp. *seppeltiana* as a synonym of *V. sieberiana*, but the Australian Plant Census maintains it as distinct pending resolution of its status (Council of Heads of Australasian Herbaria 2006–). *Viola sieberiana* and *V. hederacea* subsp. *seppeltiana* share a ±rectangular anterior petal that is pale at the base and coloured at the apex, ±concolorous, pale blue flowers and spathulate leaves with cuneate leaf bases. In this they are both clearly distinct from *V. hederacea sens. str.*, which has an obovate anterior petal that is coloured towards the base and white at the apex, discolourous (violet and white) flowers, and reniform leaves with cordate leaf bases. *Viola hederacea* subsp. *seppeltiana* should thus be regarded either as conspecific with *V. sieberiana*, as a species, or as a subspecies of *V. sieberiana*. We recommend the former pending resolution of its status with respect to *V. sieberiana*. It is clearly not a subspecies of *V. hederacea*.

Viola hederacea subsp. *curtisiae* was erected to accommodate two specimens, both from the vicinity of Mount Field in Tasmania, which Adams considered differed from typical *V. hederacea* in having the lateral petals without a beard, with short flowering scapes scarcely exceeding the leaves, and all petals emarginate or bilobed. He described the corolla as concolorous or discolourous and blue-violet (although the type has no colour information on the collecting notes and the flowers are faded). The type (*W. Curtis s.n.*, HO 29454) was collected from "Mt Mawson" in 1948, while a second cited specimen (*J.R.H. Telford 2175*, CBG 27187.1) was collected from Lake Dobson in 1969. The latter locality is

c. 2 km from the summit of Mt Mawson; the specimens may have been collected from the same locality.

Since Adams' treatment two other specimens from Tasmania have been determined as *V. hederacea* subsp. *curtisiae*, viz. *J.M.B. Smith 258* (HO 36373) from "Near Lake Dobson", and *A.M. Gray 1160* (HO 520456) from Russell Falls Creek. The latter locality is c. 10 km east of the former, in an area of substantially lower elevation (220 m cf. >1000 m) and rainfall, and in a very different habitat (mossy wet sclerophyll forest vs. alpine snow gum woodland). It was redetermined to typical *V. hederacea* in 2017 (MdS). Re-examination of the collections at HO has revealed one additional specimen (*A.E. Orchard 5201*, HO 443311) collected from the vicinity of Mount Wellington near Hobart in 1981. *Viola hederacea* subsp. *curtisiae* is thus known from only four collections in Tasmania, all from the south east of the state at similar elevations and all from the same dolerite substrate and the same broad vegetation type.

In 1990, a specimen of *Viola* of uncertain affinities (*Lester & Davies s.n.*, MEL 1593752) was collected in Victoria from near Mt Erica on the Baw Baw Plateau. This entity has been treated in published censuses of Victorian plants as *V. hederacea* subsp. nov. (Baw Baws) since Ross (1993), including in the most recent census (Walsh & Stajsic 2007). It was suggested by T. James (NSW) *in litt.* (1995) to have possible affinities with *V. hederacea* subsp. *curtisiae*, and was discussed in a note under *V. hederacea* in the *Flora of Victoria* (Entwisle 1996). In 2015, one of us (AM) collected sterile, living material of this entity from Mount Erica, which was subsequently grown on in the Melbourne nursery of the Royal Botanic Gardens Victoria. This retained field characters that were significantly different from *V. hederacea*, with concolorous, white flowers on short scapes no longer than the leaves, although the glasshouse-grown plants were substantially more robust and leafier than field plants.

Field work in 2017 showed that the plants are distinctive, and occur at several sites on the Baw Baw Plateau, where they occupy a distinct habitat separate from and at higher elevations than typical *V. hederacea*. The latter is common on roadside banks and relatively dry, loamy slopes at a wide range of elevations from the foot of Mount Erica to just below the edge of the summit plateau at an elevation of 1030 m, in a range

of forest types including *Eucalyptus regnons* F. Muell. and low-elevation *E. radioto* Sieber ex D.C. forest. Plants have relatively long scapes, usually longer than the leaves, with flowers that are consistently and distinctly bicoloured (violet and white) with bearded and twisted lateral petals. In contrast, plants from the summit plateau above 1050 m, growing in moist *Eucalyptus regnons*, *E. gloucescens* Maiden & Blakely, *E. delegatensis* R.T. Baker, *E. nitens* (H. Deane & Maiden) Maiden and *Nothofagus cunninghamii* (Hook.) Oerst forest, have concolorous flowers (petals white adaxially, white with obscure purplish markings abaxially) on short scapes, with beardless and non-twisted lateral petals. Both taxa were found to be morphologically highly consistent, and with no intergradation.

Subsequently, one of us (MdS) revisited the type population of *V. hederaceo* subsp. *curtisiae* at the Mount Mawson Ski Field, where plants were found growing abundantly on sheltered, east-facing gentle slopes beneath *Eucalyptus coccifero* Hook. f woodland with stunted *Nothofagus cunninghamii*. These were consistent in all respects with the Victorian plants, and clearly comprise the same taxon. Other collections at HO show that typical *V. hederaceo* also grows in close proximity to the type population, at Lake Fenton (2.5 km east of Lake Dobson, with the same elevation and substrate), and on Mount Wellington.

The morphological consistency of plants referred to *V. hederaceo* subsp. *curtisiae*, both at each locality and between the disjunct populations, consistent differences from typical *V. hederaceo*, and lack of intergradation with that species despite their close proximity at the Mt Erica site and at Mt Field and Mt Wellington, lead us to conclude that, as with the other subspecies described by Adams (1982), *V. hederaceo* subsp. *curtisiae* is best treated at species rank. Accordingly, it is recombined here as *V. curtisiae* (L.G.Adams) K.R.Thiele.

Taxonomy

Viola curtisiae (L.G.Adams) K.R.Thiele, comb. et stat. nov.

Viola hederaceo Labill. subsp. *curtisiae* L.G.Adams, *Fl. Aust.* 8: 386 (1982). Type: Tasmania. Mt Mawson, Mt Field National Park, 6 Jan. 1948, *W.M. Curtis s.n.* (holo: HO 29454).

Viola hederaceo subsp. nov. (Baw Baws) *sensu* Ross 1993, 1996, 2000; Ross & Walsh 2003; Walsh & Stajsic (2007).

Perennial herb spreading widely by stolons; rootstock sometimes somewhat swollen and bulbous at the stem bases. *Stems* contracted with leaves forming rosettes, never elongate with caulescent leaves. *Leaves* with petioles (0.5–)2–5 cm long; *lamina* ±semi-circular to slightly reniform, the largest 6–15 mm long, 8–22 mm wide, c. 1.2–2 times wider than long, broadly cuneate, truncate or broadly cordate at base, with 7–13 indistinct teeth, glabrous or sparsely hispid with scattered unicellular hairs c. 0.5 mm long on the upper surface mostly toward the margins, dark green and usually slightly glossy above, dull greyish-green beneath; *stipules* 2–3 mm long, narrowly triangular or trifid, usually with several small, glandular teeth on each side. *Flowers* on scapes to 3 cm long, mostly shorter than the leaves (often considerably so), rarely subequal to or slightly longer than leaves. *Bracteoles* at the base or in the basal 1/2 of the scape, narrowly triangular, c. 3 mm long, c. 0.5 mm wide. *Sepals* 2.5–4 mm long. *Petals* concolorous or slightly discolorous, white adaxially sometimes with faint purplish venation or pale violet patches towards the centre-lines of some petals, abaxially white or variably purple-flushed; segments not widely opening but with ±reflexed apices; entire corolla often ±broadly cylindrical to broadly campanulate; *anterior petal* 5–7 mm long, 3–5 mm wide, broadly elliptic, widest at or very near the middle, broadly emarginate, 3(–5)-nerved at base, the nerves dividing and becoming indistinct above midway; *lateral petals* 5–6.5 mm long, 2.5–3.5 mm wide ±rectangular, slightly falcate, broadly emarginate at apex, not twisted, glabrous (i.e. beardless); *dorsal petals* 5–6.5 mm long, 2.5–3.5 mm wide, obovate, rounded to truncate, usually emarginate, occasionally minutely apiculate in the notch. *Anthers* c. 1.5 mm long, cream; *anther appendages* exceeding anthers by 1–2 mm, the terminal portion slightly dilated and straw-coloured, minutely papillate, the proximal portion white, pilose; *glands on ventral anthers* cream to green, shorter than the anther cells, irregularly rugose, ±allantoid; *pollen* and interior margins of the anther cells white to cream. *Ovary* pale green, faintly lilac-mottled; style 1.2–1.8 mm long, erect but distinctly geniculate at its insertion on the ovary. *Fruit* broadly ellipsoid, 6–8 mm

long, cream at maturity. *Seeds* ovoid, 1.9–2.1 mm long, c. 1.3 mm diam., uniformly dull brown or with indistinct, minute, pale mottling, \pm smooth. (Figure 1)

Diagnostic features: May be distinguished from all other taxa in *Viola* sect. *Erpetion* by the combination of semi-circular to slightly reniform leaves, flowers concolorous white to slightly discoloured (i.e. with or without obscure purplish markings abaxially and obscure purplish veins or patches adaxially) on short scapes not exceeding the leaves, petals all \pm emarginate, and lateral petals beardless and gently reflexed but not twisted.

Other specimens examined: VICTORIA. Baw Baw National Park, Alpine Walking Track between Mount Erica carpark and Mushroom Rocks, *K. Lester & J. Dovies s.n.*, 29.xi.1990 (MEL); Baw Baw National Park, beside Alpine Walking Track, c. 400 m north from Mt Erica carpark, *N.G. Walsh 4900*, 22.xii.1998 (MEL); Mt Baw Baw Village Road 3.6 km from Mt Baw Baw Village, *K.R. Thiele, S.M. Prober & K. Seaton KRT5449*, 15.xii.2017 (MEL); Baw Baw National Park, Mt Erica Road 0.4 km from right turn to carpark near summit plateau, *K.R. Thiele, S.M. Prober & K. Seaton KRT5450*, 15.xii.2017 (MEL). **TASMANIA.** Mt Mawson, National Park, *W.M. Curtis s.n.*, 6.i.1948 (HO); Lake Dobson, Mt Field National Park, *I.R. Telford 2175*, 2.ii.1969 (CBG); near Lake



Figure 1. *Viola curtisioe*. Plant photographed from *K.R. Thiele 5450*, Mt Erica, Victoria

Dobson, Mt Field, *J.M.B. Smith* 258, 6.i.1978 (HO); The Lactern, Mt Wellington, *A.E. Orchard* 5201, 13.i.1981 (HO); Urquhart Track, Mount Field NP, *J. Little s.n.*, S.ii.2017 (HO); Mt Field NP, Lake Dobson. Start of track to Mawson Ski Area, *M.F. de Salas* 1927, 26.xii.2017 (HO, MEL); Mt Field NP, Track to Mawson Ski Area, approximately 200 m NW of Lake Dobson, *M.F. de Salas* 1928, 26.xii.2017 (HO, CAN8); Mt Field NP, Mt Mawson Ski Area, approximately 400 m W of Eagle Tarn, *M.F. de Salas* 1929, 26.xii.2017 (HO, MEL).

Phenology: Flowers in late spring and summer.

Distribution and habitat: Currently known from three widely disjunct localities: the Lake Dobson–Mt Mawson area in Mount Field National Park, and near Mount Wellington, both in Tasmania; and along the southern rim of the Baw Baw Plateau in Victoria. In Tasmania it occurs in sheltered, east-facing sites beneath *Eucalyptus coccifera* woodland with scattered *Nothofagus cunninghamii*, whereas in Victoria it occurs beneath tall forest of *Eucalyptus regnans*, *E. nitens*, *E. delegatensis* and *E. glaucescens* with scattered *N. cunninghamii*, in both cases at elevations above 1000 m.

Two further localities are given in the Tasmanian Natural Values Atlas (<https://www.naturalvaluesatlas.tas.gov.au/downloadattachment?id=14622>), at Lake Ewart in Cradle Mountain Lake St Clair National Park and at Mt Huxley near Queenstown. However, these are based on unvouchered observational records and cannot be verified. It is possible that *V. curtisiae* has been overlooked in other locations, both in Tasmania and Victoria, in similar habitats and elevations.

Conservation status: *Viola curtisiae* is listed (as *V. hederacea* subsp. *curtisiae*) as rare under the Tasmanian *Threatened Species Protection Act 1995*. It is not currently listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. In both Victoria and Tasmania, its known occurrences are wholly contained within national parks.

Notes: *Viola curtisiae* is a distinctive species that is clearly localised and rare, even if some populations have been overlooked. Its leaves are semi-circular to slightly reniform and not much broader than long, very similar to those of *V. hederacea sens. str.* In having concolorous to slightly discolorous flowers it is similar to *V. cleistogamoides*, *V. fuscoviolacea*, *V. sieberiana* and *V. silicestris*. However, the first two of these have substantially smaller flowers, with the petals (white in *V. cleistogamoides*, very dark purple in *V. fuscoviolacea*) scarcely exceeding the sepals,

while the latter two species have concolorous pale blue flowers on long scapes. The lateral petals in *V. curtisiae* are consistently beardless, a useful feature for distinguishing it from *V. hederacea*.

Distinctively also, all petals are shallowly to distinctly emarginate, and all are \pm the same width. The lateral petals are gently reflexed but not twisted. The flowers thus present a distinctive, “almost actinomorphic” aspect that is unique in sect. *Erpetion*. This feature, while noticeable in fresh flowers, is difficult to assess from pressed specimens.

The epithet, which commemorates Dr Winifred M. Curtis, is similar to that of *Viola curtisii* E.Forst., the basionym of *V. saxatilis* subsp. *curtisii* (E. Forst.) Kirschner & Skalický and *V. tricolor* subsp. *curtisii* (E. Forst.) Syme (the currently accepted name for the taxon; see The Plant List 2013); this species commemorates William Curtis (Rix 2014). Given the different genders and, now, different ranks, we do not consider these to be confusable epithets.

With *V. hederacea* subsp. *curtisiae* now raised to species rank, and subsp. *seppeltiana* clearly allied with or synonymous with *V. sieberiana*, *V. hederacea* is now a morphologically relatively consistent species without infraspecies.

Acknowledgements

We thank Kerry Seaton for valuable assistance in the field at Mount Erica, Victoria.

References

- Adams, L.G. (1982). ‘Violaceae’, in George, A.S. (ed), *Flora of Australia*, 8, 91–110. ABRIS: Canberra/CSIRO Publishing: Melbourne.
- Council of Heads of Australasian Herbaria (2006–). National Species List. Accessed January 2018. <<https://biodiversity.org.au/nsl/services/APC>>
- Entwisle, T.J. (1996). ‘Viola’, in N.G. Walsh & T.J. Entwisle (eds), *Flora of Victoria* 3, 362–367. Inkata Press, Melbourne.
- Rix, M. (2014). *Curtis’s Botanical Magazine* 31(1), 17–25.
- Ross, J.H. (1993). A census of the vascular plants of Victoria, edn 4. Royal Botanic Gardens Melbourne.
- The Plant List (2013). Version 1.1. Accessed January 2018 <http://www.theplantlist.org/tp1.1/record/kew-2894966/>
- Thiele, K.R. and Prober, S.M. (2003). New species and a new hybrid in the *Viola hederacea* species complex, with notes on *Viola hederacea* Labill. *Muelleria* 18, 7–25.
- Walsh, N.G. & Stajsic, V. (2007). A census of the vascular plants of Victoria, edn 8. Royal Botanic Gardens Melbourne.